



Review of Maules Creek Coal Project  
Environmental Assessment - Appendix Q (economic assessment)

Prepared by  
Economists at Large Pty Ltd

September 2011

**Report prepared by:**

Economists at Large Pty Ltd  
Melbourne, Australia  
www.ecolarge.com  
info@ecolarge.com

Phone: +61 3 9005 0154 | Fax: +61 3 8080 1604  
98 Gertrude St, Fitzroy VIC 3065, Melbourne, Australia

**Citation:**

Campbell, R., Doan, E., Kennedy, M., McKeon, R., 2011, *Review of Maules Creek Coal Project Environmental Assessment - Appendix Q (economic assessment)*, a report for the Maules Creek Community Council (MCCC), prepared by Economists at Large, Melbourne, Australia.

**Disclaimer:**

The views expressed in this report are those of the authors and may not in any circumstances be regarded as stating an official position of the organisations involved.

This report is distributed with the understanding that the authors are not responsible for the results of any actions undertaken on the basis of the information that is contained within, nor for any omission from, or error in, this publication.

# Contents

<b>Executive Summary .....</b>	<b>4</b>
<b>Introduction .....</b>	<b>5</b>
<b>Background.....</b>	<b>5</b>
<b>This submission.....</b>	<b>5</b>
<b>Inconsistent scope of analysis.....</b>	<b>6</b>
<b>Consideration of alternative projects-no underground option considered.....</b>	<b>6</b>
<b>Net Production benefits .....</b>	<b>8</b>
<b>Royalties.....</b>	<b>9</b>
<b>Opportunity Costs .....</b>	<b>10</b>
<b>Greenhouse gasses.....</b>	<b>10</b>
<b>Discussion of distribution of costs and benefits .....</b>	<b>10</b>
<b>Miscalculation and/or omission of external costs and benefits.....</b>	<b>12</b>
<b>Health Impacts.....</b>	<b>12</b>
<b>Social value of employment.....</b>	<b>13</b>
<b>Recreation .....</b>	<b>16</b>
<b>Inconsistency of calculations .....</b>	<b>17</b>
<b>Revenue.....</b>	<b>17</b>
<b>Operating Costs.....</b>	<b>19</b>
<b>Conclusion.....</b>	<b>20</b>
<b>References .....</b>	<b>21</b>

## Executive Summary

Economists at Large have reviewed the Economic Assessment of the Maules Creek Coal Project written by Gillespie Economics. The Economic Assessment contains flaws and omissions that make it unsuitable for decision making purposes. The Assessment should be revised to account for the following issues:

- **Inconsistent scope of analysis.** The Economic Assessment is required by NSW Department of Planning Environmental Assessment Requirements to consider the project from the perspective of the NSW community. It fails to do this on a number of fronts, notably:
  - **Consideration of alternative projects-no underground option considered** – only the option most beneficial to the proponent is considered, with no consideration of underground mining options, despite local studies finding underground mining is economically viable.
  - **Net production benefits** – Most of these will be lost to the NSW community due to the ownership structure of the project. No adjustment is made in the Economic Assessment.
  - **Opportunity costs** – considered strictly from the perspective of the proponent, with no consideration of forgone projects in NSW, or alternative uses of capital for NSW investors.
  - **Greenhouse gas costs** – confusion between what costs will accrue to NSW or the world.
  - **Discussion of distribution of costs and benefits** – Little discussion of distribution, particularly of external costs which will accrue mainly at local or state levels.
- **External costs.**
  - No consideration has been made for the debate between physical scientists as to the effectiveness of environmental offset programmes.
  - No consideration given to the health impacts of open cut coal mining and transport.
  - Social value of employment has been overstated.
  - No consideration of recreational losses.
- **Inconsistent figures.** Present value figures presented in the cost benefit analysis do not match the values presented in the text of the assessment. We present our working from the values in the text, which show differences of over \$1.5 billion on the major items of the assessment. The public can have no confidence in an assessment where large errors have been made in basic calculations such as present value. These figures need to be explained or revised.

We believe that all these issues need to be clarified and adjustments made to the economic assessment of the project to ensure a decision is made in line with the NSW public interest. Doing so would not only allow for the best outcome in relation to this project, but could serve as a guide for other projects in the area and nationally. This is occurring at a time when the mining industry is perceived as lacking a “social licence to operate” in farming areas. Robust and transparent assessment of this project can help to address this issue.

## Introduction

### Background

The proposed Maules Creek Coal Project is for an open-cut mine into agricultural land and the Leard State Forest, Narrabri Shire, NSW. The proposal is for a 21-year open cut mine which will produce up to 13 megatonnes of coal per year. The proponent is currently seeking planning approval and has prepared an Environmental Assessment.

The Maules Creek Project is one of several mining proposals or mine extension projects in this traditionally agricultural area. Local community group, the Maules Creek Community Council (MCCC) is concerned that the proposed projects will affect agriculture, the community and the Leard State Forest, which contains nationally threatened ecosystems and species. Many communities in Australia are facing similar issues and are concerned that the often-touted benefits of the mining boom may be overstated and/or not accruing to local people.

### This submission

The MCCC is making a submission on the Maules Creek Coal Project Environmental Assessment. As part of their submission they have asked Economists at Large to review *Appendix Q - Economic Assessment*. We consider there are a number of very significant issues in the economic assessment, which, without being addressed, would render the assessment unsuitable to contribute to decision-making. These issues are:

- **Inconsistency of scope.** Cost benefit analysis requires a consistent level of analysis. This scope taken in the economic assessment varies between local and global level in accordance with the interests of the proponents, contrary to the requirements of the Department of Planning.
- **Miscalculation and/or omission of external costs and benefits.** Misrepresentation of externalities arising with the project:
  - **Impact on environmental services**
  - **Health impacts**
  - **Social value of employment**
  - **Recreation**
- **Inconsistency of calculations.** The values presented in the cost-benefit analysis summary table do not correspond with values presented in the text of the appendix.

We believe that all these issues need to be clarified and adjustments made to the economic assessment of the project to ensure a decision is made in line with the NSW public interest. Doing so would not only allow for the best outcome in relation to this project, but could serve as a guide for other projects in the area and nationally.

This is occurring at a time when the mining industry is perceived as lacking a “social licence to operate” in farming areas. Conflicts between farming communities and coal and coal seam gas developments are making headlines regularly, with farmers and the broader community losing confidence that such developments are in the community’s best interests. Robust and transparent assessment of this project could help to address this issue.

## Inconsistent scope of analysis

The importance of setting the scope of a cost benefit analysis and remaining consistent with this scope cannot be overstated. As Eggert (2001) makes clear:

*Let us now turn to ... issues that challenge and bedevil practitioners of social benefit-cost analysis. The first challenge is deciding "whose benefits and costs count" .... It sometimes is called the issue of standing--that is, who has standing in the analysis of benefits and costs? This is an issue of scope. Should the analysis include only those costs and benefits affecting residents of the local community? The state or province? The nation? The world? Whether the net benefits of a project are positive or negative often depends on how narrow or broad the scope of the study is. (p27)*

The scope for this Economic Assessment is set on p4

*The NSW Department of Planning (DoP) Director-Generals [sic] Environmental Assessment Requirements (EARs) for the Project indicate that an economic assessment is needed as part of the EA. The EARs specifically require:*

*A detailed assessment of the costs and benefits of the Project as a whole, and whether it would result in a net benefit for **the NSW community** (bold added)*

However, contrary to this requirement, the Economic Assessment assesses costs and benefits not from the perspective of the NSW community but from a range of perspectives, from the narrow perspective of the proponents to a broad global perspective, depending on the item. Note how the scope of analysis is different in the following sub sections.

### Consideration of alternative projects-no underground option considered

The Economic Assessment includes only two alternatives – a 21 year extension using open cut methods or no activity at all. Identification of alternative projects is made strictly from the perspective of the proponent and not from the view of the NSW community:

***Aston Resources' alternatives** for the mining of coal are essentially limited to different scales, designs, technologies, processes, modes of transport, timing, impact mitigation measures, etc. However these alternatives could be considered to be variants of the preferred proposal rather than distinct alternatives. (p6) (Bold added)*

Identification and evaluation of alternatives is one of the most important parts of project economic evaluation. This is made clear in all guides to cost benefit analysis, including one co-written by the author of the Economic Assessment, Gillespie & James (2002):

*The main aims of an economic efficiency analysis are to...provide a framework for the evaluation of feasible alternatives. (p5)*

See also:

*Cost-benefit analysis is a procedure for comparing alternative courses of action by reference to the net social benefits that they produce for the community as a whole.* (Commonwealth of Australia 2006, p2)

*“One of the most important steps in project evaluation is the consideration of alternatives throughout the project cycle, from identification through appraisal.”* (Belli et al. 1997, World Bank Handbook on Economic Analysis)

Most obviously, the Economic Assessment includes no consideration of an underground mining option, an option the local community has indicated it would support. A neighbouring coal project, the Boggabri Mine Extension Project, did engage consultants to analyse an underground mining option, WDS Consulting, (2009). WDS concluded that underground mining was both technically feasible and economically viable. In depth calculations of the underground option were not included in the cost-benefit analysis of the Boggabri Mine as:

*At the request of [proponents] Idemitsu, a full financial analysis was not within [the consultant’s] deliverable scope. Our primary financial deliverables, ... are to be integrated into Idemitsu cost models for internal economic analysis.* (WDS 2009, p7-1)

Economists at Large reviewed WDS’s work and conducted basic financial analysis of the data presented. We concluded that the profitability of the underground as presented in the WDS study was \$500 million greater than that of the preferred option presented in the Boggabri Coal Project Economic Assessment (also by Gillespie Economics).

**Table 1 Underground and open cut mining options for Boggabri Coal Project**

	<b>Boggabri Coal Project Environmental Assessment Appendix C - Underground option (\$m)</b>	<b>Boggabri Coal Project Environmental Assessment Appendix Q - Economic assessment (open cut mining option) (\$m)</b>
<b>Revenue</b>	\$3,730	\$5,343
<b>Other production benefits</b>	NA	\$54
<b>Capital costs</b>	\$652	\$778
<b>Operating costs</b>	\$1,288	\$3,328
<b>Other production costs</b>	NA	\$25
<b>NPV</b>	\$1,790	\$1,266

Source: Campbell (2011)

Gillespie Economics’ rationale for not including a viable underground option in their cost benefit analysis of the Boggabri Mine was that *“alternatives need to be **feasible** to the proponent”* (bold in original) (Gillespie, 2011). But cost benefit analysis of the Maules Creek project is required to consider the benefits for the NSW community. As underground mining in the area has been found

to be economically viable, the cost benefit analysis must consider how this option would affect the welfare of the NSW community.

### Net Production benefits

Net production benefits – the profits from selling the coal – are the main benefits from the project. How much of these will accrue to the people of NSW is unclear, but is of great importance to the assessment of the project, as made clear by Eggert (2001) who states that when considering the perspective of local communities *“an analyst must be careful to ... eliminate any net benefits that accrue to nonresidents of the community”* (p28). Eggert makes clear that in the case of a national-level assessment: *“a national government would consider profits sent abroad as a cost.”* (p27) As this assessment is to focus on NSW, profits sent outside of NSW should not be considered a benefit of the project.

An estimate of how much of the production benefit/profit of the project will be retained in NSW and how much will be lost to the NSW community should have been included in the Economic Assessment. A detailed estimate is beyond the scope of our submission; however some indications can be gained from media reports, Aston Resources annual report and Bloomberg Data.

As reported in the Australian newspaper<sup>1</sup> Itochu Corporation of Japan owns 15% in the Maules Creek Project. A further 10% of the project looks set to be sold to Tokyo-based Electric Power Development Co<sup>2</sup>. The remaining 75% of the project is owned by Aston Resources. Aston Resources top shareholders and their places of residence or registration are summarised in Table 2.

Table 2 Aston Resources major shareholders

	Shareholder	Stake	Registration/ residence	Source
1	Nathan Tinkler	31%	NSW	<a href="http://en.wikipedia.org/wiki/Nathan_Tinkler">http://en.wikipedia.org/wiki/Nathan_Tinkler</a>
2	Farallon CR Sidecar	7%	USA	<a href="http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=99047910">http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=99047910</a>
3	Burlingham Intl ltd	7%	UK	<a href="http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=115281942">http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=115281942</a>
4	Wellington Management	6%	USA	<a href="http://wellington.com/">http://wellington.com/</a>

<sup>1</sup> <http://www.theaustralian.com.au/business-old/mining-energy/aston-resources-unlikely-to-sell-down-tier-one-stake-to-itochu/story-e6frg9e6-1226074987934>

<sup>2</sup> <http://www.theaustralian.com.au/business/mining-energy/aston-resources-sells-10pc-of-maules-creek-to-j-power-australia/story-e6frg9df-1226156879936>



<b>5</b>	<b>Osendo Pty Ltd</b>	5%	NSW, but is a subsidiary of Noble Group, based in Hong Kong	<a href="http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=59129114">http://investing.businessweek.com/research/stocks/private/snapshot.asp?privcapId=59129114</a> and <a href="http://www.thisisnoble.com/index.php?option=com_content&amp;view=article&amp;id=180&amp;Itemid=430&amp;lang=en">http://www.thisisnoble.com/index.php?option=com_content&amp;view=article&amp;id=180&amp;Itemid=430&amp;lang=en</a>
<b>6</b>	<b>HPRY Holdings</b>	4%	Singapore	<a href="http://perennial.listedcompany.com/news.html/id/268702">http://perennial.listedcompany.com/news.html/id/268702</a>
<b>7</b>	<b>Itochu Minerals and Energy</b>	3%	Japan	<a href="http://www.itochu.com.au/">http://www.itochu.com.au/</a>
<b>8</b>	<b>Kuok Inv Singapore</b>	3%	Singapore	<a href="http://www.kuokgroup.com.sg/">http://www.kuokgroup.com.sg/</a>
<b>9</b>	<b>Hannigan Todd</b>	2%	NSW or Qld	<a href="http://astonresources.com/about-us/board-of-directors">http://astonresources.com/about-us/board-of-directors</a>
<b>10</b>	<b>Todd Tom</b>	2%	Qld	<a href="http://au.linkedin.com/pub/tom-todd/7/535/904">http://au.linkedin.com/pub/tom-todd/7/535/904</a>

Source: retrieved from Bloomberg 30/9/2011

We see that of the ten major shareholders, only one is definitely based in NSW. We suggest that at least half the profits of the project will not be retained by the NSW community and should therefore not be included as a benefit in the Economic Assessment if it is to comply with the DoP requirements.

That the majority of profits from this mining project will likely be lost to NSW and Australia is not unusual. Most mining projects in Australia are majority foreign owned and most mining profits are realised by foreign investors. See Edwards (2011) and Richardson & Denniss (2011) for discussion of this topic.

### Royalties

The assessment correctly does not list royalties as a cost to the producer, though they are discussed in the cost section. As these royalties accrue to the government of NSW, they are a benefit to the state. It would be helpful if these royalties were listed in Table 2.2 along with other benefits of the project, separated from the rest of the net production benefits item, which as we have seen accrues largely to investors outside of NSW.

Correctly listed in Table 2.2, royalties would need to be presented in present value form, like the other values, not the undiscounted form as on page 8. By presenting royalties without discounting, they seem higher than their present value. Present value of royalties from the project are \$1,298M, not to be confused with their undiscounted total value of \$2,800M (p8).

## Opportunity Costs

Opportunity cost is a concept in economics that incorporates the value of the foregone alternative in decision making. In other words, considering what are the cost and benefits of the next-best option available. One potential opportunity cost of the proposed project is that of not proceeding with an alternative to the project, such as an underground mine, as discussed above. However, this does not consider the complete opportunity costs from the perspective of the NSW community. This project going ahead may mean that another project does not. Without consideration of the next-best forgone alternative, the benefits of the project are difficult to evaluate.

Some opportunity costs are considered in the economic assessment, those of use of project land, water and capital. In the case of opportunity cost of capital, again we see that this is not considered from the perspective of the NSW community, but from that of the project itself. Opportunity cost of capital is listed as a zero value as no investment in capital equipment has yet occurred. The opportunity cost of capital to the community of NSW, however, is the value that NSW investors in the project could have realised investing in other projects instead of this one.

If returns on capital to NSW investors in other projects are similar to that of the proposal, then the opportunity cost of capital will be close to the share of production benefits retained by NSW investors, as discussed above. This cost would substantially offset the benefits to NSW investors, and further reduce the net benefits to the project from the perspective of the NSW community as required by the DoP.

## Greenhouse gasses

The Economic Assessment uses a shadow price of \$30 per tonne of carbon dioxide to estimate the external cost to society of carbon emissions generated by the project. However, these costs accrue to the society of the world, rather than specifically to the community of NSW. The costs to NSW of these carbon emissions are likely to be lower than this.

The costs of the burning of this coal by its purchasers, however, will also be borne by the NSW community along with the rest of the world. The “dope dealer’s defence<sup>3</sup>” taken by coal mining companies – that if we didn’t sell it to users, somebody else would – leaving complete responsibility for the emissions of coal burning with the purchasers, fails to consider that the NSW community will also bear the costs of these emissions through climate change.

## Discussion of distribution of costs and benefits

As we have seen the Economic Assessment fails to consider the costs and benefits of the project consistently from the perspective of the community of NSW as it is required to do. There is little discussion in the assessment of how costs and benefits are distributed, the only reference being on p13-14:

---

<sup>3</sup> <http://www.abc.net.au/lateline/content/2008/s2575384.htm>

*“(benefits will be) distributed amongst a range of stakeholders including:*

- *The local community in the form of donations and community support programs;*
- *Aston Resources and its shareholders;*
- *The NSW Government via royalties; and*
- *The Commonwealth Government in the form of Company tax.”*

As we have discussed, the benefits to most of the project’s shareholders and taxes to the Commonwealth Government are not relevant in understanding the project’s value to the NSW community. It is disappointing that the benefits of state royalties and local community donations are not quantified or discussed in any detail in the economic assessment, as it is these benefits that are of great interest to the local community and the community of NSW.

The distribution of cost and benefits of coal mining projects are well understood by Gillespie Economics, who provided input into the following Table 3, originally published in (Campbell, 2011).

**Table 3 Distribution of Costs and Benefits of coal mining projects**

	<b>Benefits</b>	<b>Costs</b>
<b>Global</b>	After tax profits	Greenhouse gasses
<b>National</b>	Company tax	
	After tax profits	
<b>State</b>	Royalties	Ecology
	After tax profits	Heritage
	Social benefits of employment	
<b>Local</b>	Unquantified and unspecified community support programs	Air quality
		Noise and vibration
		Groundwater
		Traffic
		Visual impacts
		Surface water
		Health impacts

Source: modified from Campbell (2011) to reflect ownership of Aston Resources as discussed above

We see that while only some of the benefits of mining projects accrue at a state or local level, almost all external costs and benefits do accrue to these communities. This inequitable distribution of costs and benefits is at the heart of the present conflict between mining and communities. This makes it all the more important that external costs and benefits are calculated and explained in documents such as the Economic Assessment. It is therefore disappointing that the Economic Assessment makes errors and omissions in their calculation.

## Miscalculation and/or omission of external costs and benefits

If all external costs can be internalised by an offset programme then there is no need to estimate their values. This is reason that the Economic Assessment assigns zero values to most of the external costs arising from the project, as listed in table 7 above. However, the allocation of a zero value, with no sensitivity testing, ignores the debate between physical scientists as to what extent these offsets are achievable. See for example:

- ViPAC (2011) who question the findings of the environmental assessment's air quality study
- Water Resources Australia (2011) who dispute the findings of the environmental assessment's groundwater study

We suggest it is beyond the expertise of Gillespie Economics to adjudicate in these debates between physical scientists. The allocation of zero values to these external costs is just such a judgement. When the necessary revisions are made to the Economic Assessment, we also recommend the proponents take note of Curtis (2011), who estimates the value of the ecosystem goods and services lost due to the clearing of the Leard State Forest at some \$490,000 per annum. Curtis also urges analysis of land values to consider losses of amenity and social value to the community. Curtis's background as a physical scientist, land economist and ecological economist gives his findings considerable weight.

In addition to the uncertainty around values above, others have been omitted or miscalculated:

- Health impacts
- Social value of employment
- Recreation

### Health Impacts

The economic assessment makes no mention of the impacts on human health of open-cut coal mining and transportation, despite this issue garnering considerable attention in the region, the media and academic writing. External impacts such as health can be measured and quantified in economic terms, as pointed out in Gillespie and James (2002):

*[C]ertain kinds of social impacts, such as social dislocation or adverse health effects, may be partially appraised in monetary terms. (p21)*

An example of a quantitative interpretation of health outcomes is a recent publication from Epstein et al (2011), which estimates that the cost of lives lost in the Appalachian mining region in the US is US\$74.6 billion per year (p.83). This builds on other studies such as Hendryx and Ahern (2009) who found "[a]ge-adjusted mortality rates were higher every year from 1979 through 2005 in

Appalachian coal mining areas compared with other areas of Appalachia or the nation” (p.547), Hendryx and Ahern also refer to past research on coal mining regions that found elevated levels of chronic heart, respiratory, and kidney disease, and lung cancer, after control for socioeconomic factors. They found that the health impacts far outweighed the economic benefits of mines.

Similarly, a report from the Nobel Peace Prize-winning organisation Physicians for Social Responsibility found that “coal pollutants affect all major body organ systems and contribute to four of the five leading causes of mortality in the U.S.: heart disease, cancer, stroke, and chronic lower respiratory diseases.” (Lockwood et al. 2009)

Closer to home, a study investigating the direct and indirect health impacts of coal mining is currently underway in the Hunter Valley, by the University of Sydney’s Health and Sustainability Unit. This follows long-term reports of negative health impacts, including a ‘cancer cluster’ and increased respiratory conditions, many of which were outlined by a report on ABC’s *Four Corners* program last year (ABC 2010).

With long-term, empirical evidence linking significant health impacts to coal mining, it is important that the costs associated with impacts are included in consideration of this project. Clearly these are costs that accrue to the local and NSW community and should be included in the assessment.

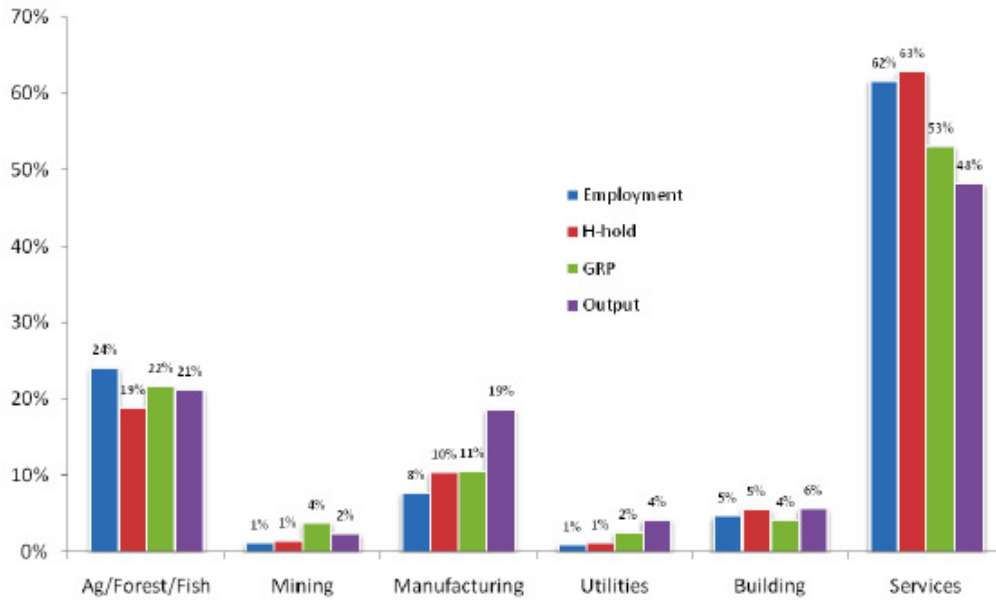
### **Social value of employment**

The Economic Assessment discusses and places a value on the existence values that the NSW public places on rural jobs and communities. It is important to realise that the values mentioned in the Economic Assessment regarding employment are derived not from a study relating to the Maules Creek mine, but to a mine in the Illawarra, Bulli Seam Operations (see Gillespie Economics 2009). This is important, as the two mines differ in two significant ways:

Firstly, the Illawarra Bulli Seam operation is an underground, longwall mine, while Maules Creek is open cut. The survey presented to respondents was based on environmental issues such as land subsistence and impacts on local streams – hardly comparable to open cut mining of a state park with listed threatened ecosystems. If an underground option for the Maules Creek project was being considered, perhaps this would be a relevant study, but it seems unlikely respondents would give similar answers to the open cut option.

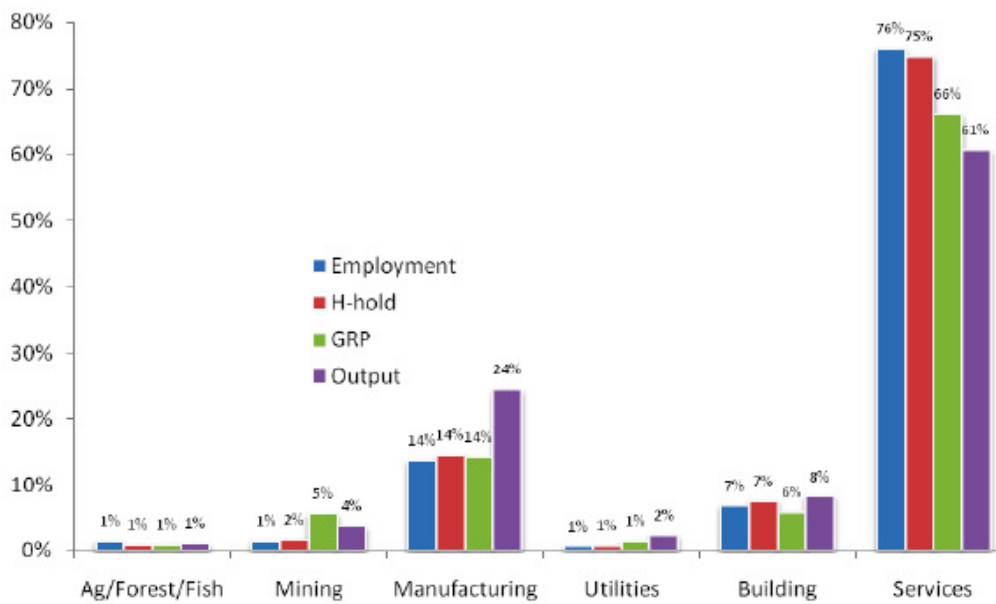
Secondly, the Bulli Seam operation is in an area where coal mining plays quite a different role in the local economy. Note in the graphs below, taken from the Bulli Seam report and the Economic Assessment, that coal mining is a larger part of the Illawarra economy than agriculture, while in the Maules Creek area agriculture is dominant.

**Chart 1: Economic structure in the region around Maules Creek**



Source: Figure 3.1, p.17 from Economic Assessment.

**Chart 2: Economic structure in region around Bulli Seam**



Source: Figure 3.1, p.31 from Bulli Mining Operations Socio-Economic Assessment

Note the difference in the importance of the Ag/Forest/Fish section of the two regions. It seems unlikely that respondents would place the same value on 400 mining jobs in an agricultural area, in an open cut mine that may threaten agriculture, as they would on 1,170 mining jobs in an underground mine in a traditional mining area.

Furthermore, the Bulli Seam study is based on a survey with serious flaws that cast doubt on its values attached to employment. The survey informs respondents of some local impacts of mining:

*Mining can also result in the clearing of native vegetation and the loss of Aboriginal heritage sites from the construction of mine surface infrastructure i.e. buildings and coal stockpile areas. (Gillespie Economics, 2009, Attachment 1 p1)*

However, no mention is made of the long-running mining boom, the labour shortages faced by the mining industry and the macroeconomic effects of the mining boom. The latter point is explored by Richardson & Denniss (2011) who outline how the mining boom has driven up exchange rates leading to job losses in exchange rate-sensitive industries such as manufacturing and tourism, both far bigger employers than mining.

Neither Gillespie Economics (2009) nor this economic assessment discuss the tendency for mining jobs to accrue less to local people and more to mining specialists who “fly-in and fly-out” (FIFO). The mining industry in Australia is largely serviced by a FIFO workforce, which has become the standard for resource development in remote areas (Storey 2010). Given this, it is reasonable to assume that at least part of the Maules Creek Mine workforce will comprise of FIFO workers, in which case, the positive economic benefit to the region is questionable and the willingness of the NSW community to pay for such jobs unlikely.

At the regional level, FIFO presents challenges for development, and ‘the practice of fly-in, fly-out is an ongoing factor limiting the expansion of the region... Fly-in, fly-out is impacting negatively on smaller communities’ (RDC, 1996). The complex economic and social consequences for mining communities and regional development as a result of FIFO operations is also explored in studies by Storey (2001), Hajkovicz (2011) and others.

A study on FIFO operations by Rolfe et al. suggests that the increased reliance on a non-resident workforce has meant that an increasing proportion of the economic stimulus from mining is flowing out of mining towns and into regional and metropolitan centres (Rolfe et al., 2007). The growth in the mining support sector has tended to be based in larger communities and strategic centres fulfilling the role of service hubs. As a result, a large proportion of the direct and indirect economic impacts of mining and employment have bypassed smaller local economies and focused immediately on the larger regional centres. McHugh states that by accessing their workforces and buying supplies and services from larger metropolitan centres, while benefiting from the resources of rural regions, mining companies cannot claim to be giving back to the regions in which they operate (McHugh, 2009). The loss of local benefits of resource developments in remote areas is described by Storey as the ‘fly-over’ effect of FIFO (2001). Storey queries the positive social value of FIFO employment and suggests that this ‘fly-over effect’ results in a ‘no town’ mining model (rather than a ‘new town’ model) (2010).

Government policy can address concerns raised by FIFO by ensuring that development approval of the Project is closely tied to industrial benefits, planning strategies and impact benefits agreements that seek to maximise local area benefits (see Storey and Shrimpton, 2008). No such discussion is included in the Economic Assessment. Unless the fly-over effects of FIFO are mitigated by agreements between Aston Resources, the Maules Creek community and the government, in which hiring and purchasing preferences are given to local workers and businesses, the negative implications of a FIFO workforce must be considered in an economic assessment of the overall economic and social impact of employment on the Maules Creek community.

Finally, we note the inconsistency between the employment estimates in the first and third paragraphs on p12 of the assessment:

*[T]he project would generate up to 470 direct jobs (398 on average) during the operational period of 21 years. (Paragraph 1)*

*The project will provide an average of 416 direct jobs for a period of 21 years. (Paragraph 3)*

It is very difficult to understand from the Economic Assessment what benefits of employment there would be from this project, whether these benefits would accrue to the local community and whether the NSW community places any value on these jobs.

### **Recreation**

The Economic Assessment makes no mention of recreation values of Leard State Forest that will be lost due to mining. The same omission was made in the economic assessment of the Boggabri Mine, (Gillespie 2011). When this omission was pointed out in Economists at Large and MCCC submissions, the proponents calculated a “back-of-the-envelope” lost recreation value amounted of \$4 million in present terms. A calculation of the lost recreational value should be included in the Economic Assessment of the Maules Creek mine.



## Inconsistency of calculations

Major values presented in the Economic Assessment Table 2.2 (p13) do not correspond with values presented in the rest of the assessment. We have calculated the present values of operating costs and revenue from values presented on pages 8, 9 and 13 of the assessment. These values vary by over \$1.5 billion with those presented in table 2.2 and are summarised below.

**Table 4 Comparison of revenue and operating cost calculations**

	Table 2.2	Calculated from text	Difference
<b>Revenue (\$M)</b>	14,336	16,011	1,675
<b>Operating costs (\$M)</b>	5,134	6,655	1,521

The point of this comparison is not to suggest that project is more valuable than was presented, but to show that the public can have no confidence in the figures presented. We urge the proponents to explain how they arrived at their present value figures and to publish their full working and modelling. Our calculations are explained in the following sub-sections.

### Revenue

Our calculations, based on values on pages 8, 9 and 13 of the assessment, result in a present value of \$16,011M, which is \$1,675M greater than the value presented in Economic Assessment Table 2.2.

The value of average annual revenue presented on p9 is \$1,600M. To achieve this level of average annual revenue, with production to “ramp up” from zero to 13Mtpa by year 8 requires a weighted coal price of \$USD117.63 across the three different types of coal the mine will produce, thermal coal, semi-soft coking coal and PCI coal. This means that the mine must produce portions of coal summarised below:

**Table 5 Obtaining weighted price for average annual revenue value**

	Unit		Percentage
<b>Thermal coal</b>	USD/tonne	96	43%
<b>Semi-soft coking coal</b>	USD/tonne	135	47%
<b>PCI coal</b>	USD/tonne	129	10%
<b>Weighted price</b>	USD/tonne	117.6	

While not explained in the Economic Assessment, this weighting is in line with estimates published on the Aston Mining website<sup>4</sup>. Using this price, however, results in a total present value revenue of \$A 16,011M, which does not match the \$A 14,336M printed in table 2.2 (p.13). Our full calculations are provided in Table 6 below.

<sup>4</sup> <http://astonresources.com/maules-creek/project/maules-creek-project/>

Table 6 Present value of revenue

	Unit	Value	Yr 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Annual Coal Production	Mtpa		1.6	3.3	4.9	6.5	8.1	9.8	11.4	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Weighted Price	\$USD/t	117.6																					
Annual Revenue USD	\$USD M		191	382	573	764	956	1,147	1,338	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529	1,529
USD/AUD		0.76																					
Annual Revenue AUD	\$AUD M		251	503	754	1,006	1,257	1,509	1,760	2,012	2,012	2,012	2,012	2,012	2,012	2,012	2,012	2,012	2,012	2,012	2,012	2,012	2,012
Average Annual Revenue	\$AUD M	1,600																					
Discount Rate		7.0%																					
Present Value Revenue	\$AUD M		235	439	616	767	896	1,005	1,096	1,171	1,094	1,023	956	893	835	780	729	681	637	595	556	520	486
Total PV Revenue	\$AUD M	16,011																					

## Operating Costs

In the Economic Assessment average annual operating costs are estimated at \$A574M (p.8). The present value of these operating costs in Economic Assessment Table 2.2 (p13) is \$A5,134M, at 7% for 21 years. As with average revenue above, the present value of the annual figure does not match the present value presented in table 2.2. The present value of the annual value is \$A6,655M. Our full calculations are in Table 7 below.

Table 7 Present value of operating costs

	Unit	Value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Annual Operating Costs	\$AUD M	574	574	574	574	574	574	574	574	574	574	574	574	574	574	574	574	574	574	574	574	574	574	0
Discount Rate		7.0%																						
Present Value OpCosts	\$AUD M		574	536	501	469	438	409	382	357	334	312	292	273	255	238	223	208	194	182	170	159	148	-
Total PV OpCosts	\$AUD M	6,655																						

The difference between these figures and the present values presented in Table 2.2 of the Economic Assessment need to be explained in a revised Economic Assessment.

## Conclusion

The Economic Assessment for the Maules Creek mine should not be used for decision making purposes without substantial revision. The Assessment's inconsistent calculations of the major financial costs and benefits of the project are contrary to normal economic and financial practice and should be explained. The lack of consideration of alternative projects is contrary to cost benefit analysis best practice, even as outlined in a handbook by the author. In particular, consideration needs to be made of underground mining, an option supported by the local community.

The scope for the Assessment, set by the Department of Planning, requires the assessment to take the perspective of the NSW community. The Assessment fails to do this in relation to:

- Alternatives
- Net production benefits
- Royalties
- Opportunity costs
- Greenhouse gasses
- Distribution of costs and benefits

Given these breaches of the Economic Assessment's requirements, we urge the Department of Planning to require its revision and to consider whether the Economic Assessment fulfils its legal requirements.

The Economic Assessment also needs to be revised to better consider external costs and benefits. The opinions of experts in the physical scientists should be considered rather than blindly accepting the assurances of the proponents that proposed offset programmes will negate any effects. Furthermore, the omissions of health impacts and loss to recreation should be amended, while values relating to the employment created by the project more carefully considered.

## References

- ABC (Australian Broadcasting Corporation), 2010. *Four Corners: A Dirty Business*. April 12. [URL: <http://www.abc.net.au/4corners/content/2010/s2867659.htm>]
- Belli, P., Anderson, JI, Barnum, H., Dixon, J., Tan, J., 1997. *Handbook on Economic Analysis of Investment Operations*, World Bank, Operations Policy Department.
- Campbell, R. (2011). *Boggabri Coal Mine Extension Project Proposal: August 2011 review of Environmental Assessment - Appendix C (underground mining option), Appendix Q (economic assessment) and subsequent submissions by Gillespie Economics*. A report for the Maules Creek Community Council (MCCC), prepared by Economists at large, Melbourne, Australia.
- Commonwealth of Australia. (2006). *Handbook of Cost-Benefit Analysis. Financial Management*. Department of Finance and Administration, Commonwealth of Australia.
- Curtis, I. (2011). *Maules Creek & Leard Forest Coal Mines: Assessment of the Environmental and Social Values and Community Concerns of the Maules Creek Community Council*. Researched and prepared by Curtis NRA.
- Edwards, Naomi. (2011) *Foreign Ownership of Australian Mining Profits: Now are we selling the farm?*, briefing paper prepared for the Australian Greens.
- Eggert, R. G. (2001). *Mining and Economic Sustainability: National Economies and Local Communities*. Report commissioned by the Mining, Minerals and Sustainable Development project of the Institute for Environment and Development, England.
- Epstein, P.R. Buonocore, J.J., Eckerle, K., Hendryx, M., Stout, B.M. III, Heinberg, R., Clapp, R.W., May, B., Reinhart, N.L., Ahern, M.M., Doshi, S.K. and Glustrom, L. Full Cost Accounting for the Life Cycle of Coal, *Annals of the New York Academy of Sciences*, vol. 1219, pp.73-98.
- Gillespie Economics. (2009). *Bulli Seam Operations Socio-Economic Assessment, Prepared for Illawarra Coal Holdings Pty Limited*. In BHP Billiton (2009) Bulli Seam Operations Environmental Assessment
- Gillespie, Robert, & James, D. (2002). *Guideline for economic effects and evaluation in EIA*. Prepared on behalf of Planning NSW. Retrieved from [http://cmsdata.iucn.org/downloads/11\\_guideline\\_for\\_economic\\_effects.pdf](http://cmsdata.iucn.org/downloads/11_guideline_for_economic_effects.pdf)
- Gillespie, Rob. (2011). *Response to residual economic matters raised by Maules Creek Community Council*. Gillespie Economics, Denistone, NSW.
- Hendryx, M. and Ahern, M.A. 2009. Mortality in Appalachian Coal Mining Regions: The Value of Statistical Life Lost, *Public Health Reports*, vol. 124, pp.541-550.
- McHugh, B. (2009) *Fly-in-Fly-out in the Noughties*; ABC Rural: Perth, Australia, 2009; available online: <http://www.abc.net.au/rural/content/2009/s2764167.htm> (accessed on 30 September 2011).

- Hajkowicz, S.; Heyenga, S.; Moffat, K. (2011) 'The relationship between mining and socio-economic well being in Australia's regions' in *Resources Policy*, 36, 2011, 30-38.
- RDC (Regional Development Council). (1996) 'Regional futures: challenges and opportunities for Western Australia's regions', a discussion paper prepared by the Regional Development Council and the Department of Commerce & Trade, Perth.
- Rolfe, J.; Miles, B.; Lockie, S. (2007). Lessons from the social and economic impacts of the mining Boom in the Bowen Basin 2004–2006. *Australasian Journal of Regional Studies*, 13 (2), 2007, 134–153
- Richardson, D., & Denniss, R. (2011). *Mining the truth: the rhetoric and reality of the mining boom*. Institute paper number 7, The Australia Institute, Canberra.
- Storey, K. (2010) 'Fly-in/Fly-out: Implications for Community and Regional Development', in *Sustainability*, 2 (5), 2010, 1161-1181
- Storey, K. (2001) 'Fly-in/fly-out and fly-over: mining and regional development in Western Australia' in *Australian Geographer* 32 (2), 2001, 133–148.
- Storey, K.; Shrimpton, M. (2008) 'Industrial Benefits Planning in North America: Current Practice and Case Studies', in *Proceedings of the Regional Planning in Greenland Conference*, Nuuk, Greenland, Denmark, 23–24 January 2008.
- ViPAC. (2011). *Maules Creek Coal Mine Peer Review EIS Air Quality*. Prepared for Maules Creek Community Council by ViPAC Engineers and Scientists.
- Water Resources Australia. (2011). *Review of Maules Creek Coal Project Groundwater Impact Assessment*. Prepared for Maules Creek Community Council and Namoi Water.
- WDS Consulting. (2009). *Underground Concept Study*. Appendix C of Environmental assessment of the Boggabri Coal Project. Retrieved from [https://majorprojects.affinitylive.com/public/ec47a18c2ed59f998d4765469401fbcd/Appendix C - Underground Concept Study\\_Part 1.pdf](https://majorprojects.affinitylive.com/public/ec47a18c2ed59f998d4765469401fbcd/Appendix%20C%20-%20Underground%20Concept%20Study_Part%201.pdf)